AMENDMENTS TO THE SPECIFICATION:

Please delete the entire section entitled "**BRIEF DESCRIPTION OF THE DRAWINGS**" found at Pages 9-11 and replace it with the following:

Figure 1 is ~~shows a~~ an integrated detector sample cell schematic of an ambient air BWA and CWA sensor based on optical spectroscopic detection.

~~Figure 2~~ Figure 2A shows a wide field dispersive Raman spectra of three different bacterial spore types including an Anthrax simulant obtained using a ChemIcon FALCON ™ Raman chemical imaging microscope. Bacteria were deposited on the microscope slide from an aqueous suspension. The microscope slide background spectrum was subtracted from each sample spectrum. Figure 2B shows a bright field transmittance image of Bacillus stearothermophilus.

~~Figure 3~~ Figure 3A is micro imaging field fluorescence-spectroscopy of two different bacterial spore types. Figure 3B shows a fluorescent micrograph of a Bacillus pumilus and Bacillus subtilus mixture.

Figures 4A through 4Q show the preliminary results of dispersive spectroscopic examination of samples sent by the US Armed Forces Institute of Pathology (AFIP), experts in the objective assessment of biothreat detection technologies. These samples include 6 unknown powders and a sample of BG spores.

~~Figures~~ Figure 4A shows dispersive Raman spectra (green laser excitation at 532 nm) of the 6 unidentified powders through the vials (raw spectra). The dispersive spectroscopy parameters were as follows: laser power density (at sample): 86-753 W/cm^2; objective: 10X; entrance slit: 25μm; grating: 150 grooves/mm; CCD exposure: 1-3 sec., 10 accumulations.

Figure 4B shows dispersive Raman spectra (red laser excitation at 789.5 nm) of the 6 unidentified powders (background corrected). The dispersive spectroscopy parameters were as follows: laser power density (at sample): 11,888 W/cm^2; objective: 40X; entrance slit: 50μm; grating: 150 grooves/mm; CCD exposure: 60 sec., 2 accumulations.

Figures ~~4C-4E~~ 4C-4D (sample 1331-002) show dispersive Raman, IR and SEM-EDS results on a first of the 6 unidentified powders. The sample is inorganic and most likely talc. Figure 4C-1 shows the Raman and FT-IR spectra. Figure 4C-2 shows an SEM image. Figure 4D-1 shows the energy dispersive spectrum. Figure 4D-2 shows a back scattered electron image.

Figures 4E-4F (sample 1325-002) show dispersive Raman, IR and SEM-EDS results on a second of the six unidentified samples. The sample is organic and most likely starch, possibly corn starch. Figure 4E-1 shows the Raman and FT-IR spectra. Figure 4E-2 shows an SEM image. Figure 4F-1 shows two energy dispersive spectra. Figure 4F-1 shows a polarized light image and two back scattered electron images.

Figures 4G-4H (sample 1303-002) show dispersive Raman, IR and SEM-EDS results on a third of the 6 unidentified powders. The sample is organic and most likely starch, possibly corn starch. Figure 4G-1 shows the Raman and FT-IR spectra. Figure 4G-2 shows an SEM image. Figure 4H-1 shows two energy dispersive spectra. Figure 4H-2 shows a polarized light image and two back scattered electron images.

Figures 4I-4N (sample 1291-006) show dispersive Raman, IR and SEM-EDS results on the remaining unidentified powders. There are 3 distinct types of powders in this sample. All 3 have organic content, while 2 of the 3 are fairly rich in aluminosilicates. One of the powders is likely a complex aromatic hydrocarbon. Figure 4I-1 shows the Raman and FT-IR spectra of a bright white particulate. Figure 4I-2 shows an SEM image for the bright white particulate. Figure 4J-1 shows an energy dispersive spectrum for the bright white particulate. Figure 4J-2

shows a back scattered electron image for the bright white particulate. Figure 4K-1 shows the Raman and FT-IR spectra for an off-white particulate. Figure 4K-2 shows an SEM image for the off white particulate. Figure 4L-1 shows an energy dispersive spectrum for the off-white particulate. Figure 4L-2 shows a back scattered electron image for the off-white particulate. Figure 4M-1 shows the Raman and FT-IR spectra for a rod-shaped particulate. Figure 4M-2 shows an SEM image of the rod-shaped particulate. Figure 4N-1 shows an energy dispersive spectrum for the rod-shaped particulate. Figure 4N-2 shows a back scattered electron image for the rod-shaped particulate.

Figure 4O shows the dispersive Raman spectra of common white powders used as masking agents. The dispersive spectroscopy parameters were as follows: laser power density (at sample): 1675 W/cm^2; objective: 20X; entrance slit: 25 μm; grating: 150 grooves/mm; CCD exposure: 1-3 sec., 1 accumulation.

Figure 4P shows the differences in dispersive Raman spectra of various Bacillus spores.

Figure 4Q shows a wide field Raman image where the 2 similar spores are differentiated on the basis of autofluorescence differences. Figure 4Q-1 shows the imaging spectrometer spectra. Figure 4Q-2 shows two micrographs.

Figures 5A through 5F show the results from additional spore samples selected specifically because the inherent difficulty in differentiating these species. They include Bacillus thuriengensis (BT), Bacillus cereus (BC) and BG. The Raman spectra from the 3 spores are different. These differences suggest a good chance of differentiating anthrax from the non-threats. The details below:

Figure 5A shows raw dispersive Raman spectra of BT and the suspension residue. The residue is from the suspension liquid. The dispersive spectroscopy parameters were as follows:

laser power density: 13,751 W/cm^2; objective: 100X, 0.95 NA; entrance slit: 50 μm; spectrometer: 0.5m, 150 grooves/mm; CCD exposure: 25 sec., 3 accumulations.

Figure 5B shows background corrected spectra of BT and residue. Both the spores spectrum and residue spectrum have been divided by a spectrum of the microscope slide. The dispersive spectroscopy parameters were as follows: laser power density: 13,751 W/cm^2; objective: 100X, 0.95 NA; entrance slit: 50 μm; spectrometer: 0.5m, 150 grooves/mm; CCD exposure: 25 sec., 3 accumulations.

Figure 5C shows a raw dispersive Raman spectra of BC and the suspension residue. The dispersive spectroscopy parameters were as follows: laser power density: 13,751 W/cm^2; objective: 100X, 0.95 NA; entrance slit: 50 μm; spectrometer: 0.5m, 150 grooves/mm; CCD exposure: 25 sec., 3 accumulations.

Figure 5D shows background corrected dispersive spectra of BC and residue. The dispersive spectroscopy parameters were as follows: laser power density: 13,751 W/cm^2; objective: 100X, 0.95 NA; entrance slit: 50 μm; spectrometer: 0.5m, 150 grooves/mm; CCD exposure: 25 sec., 3 accumulations.

Figure 5E shows a compilation of sample BT, BC and BG dispersive spectra with microscope slide background correction. The spectra are different. The differences are greatest in the fingerprint region. The samples are AFIP samples and the spectra are divided.

Figure 5F shows a compilation of the three spores after baseline subtraction and normalization to the CH region spectral feature (~2950 cm^{-1}). The samples are AFIP samples.

Figure 6 shows how Raman spectra can be applied to distinguish between multiple Bacillus bacterial strains within a single species.

Figure 7 shows how Raman spectra can be applied to distinguish between the same species and strain of bacteria grown under differing conditions.

Figure 8 shows the reproducibility of measurements of different regions of *anthracis* (Anthrax) spores. Figure 8A shows the Raman spectra from 10 different regions of interest. The spectra were collected with a FALCON Raman chemical imaging microscope. The data acquisition time was 60 seconds per spectrum. Statistical analysis (F-Test) indicates reproducibility to the 95% confidence level. Figure 8B shows micrographs from the corresponding 10 regions.

Figure 9 shows how dispersive Raman spectra can be applied to distinguish between Bacillus cerius viable and non-viable endospores, a critical variable in determining real threat level.

~~Figure 10~~ Figure 10A shows the S/N obtained in Fluorescence ~~or Raman~~ spectral detection using this wide field method. The top panel shows the Fluorescence/bright field image overlay and the bottom panel shows a graph with S/N as a function of the spore density.

Figure 10B shows the S/N obtained in Raman spectral detection using this wide field method. The top panel shows the Raman/bright field image overlay and the bottom panel shows a graph with S/N as a function of the spore density. ~~This quantifies~~ Figures 10A and 10B quantify the ability to detect microorganisms in low concentrations.

Figure 11 shows ~~ROC~~ preliminary receiver operator characteristics (ROC) curves obtained from a dispersive spectrometer using this wide field method and our digital spectral analysis that demonstrates high sensitivity and selectivity in detecting Anthrax. The method uses an un-optimized discrimination approach at 90% probability of detection and demonstrates a 5X improvement in false alarm rate.

~~Figure 12~~ Figure 12A shows a handheld pathogenic microorganism detection unit that is based on the wide field Raman method of the present invention. The detector provides 1) a handheld detection and identification system; 2) a reagentless point detection system; 3)

fluorescence (screening) and Raman (diagnostic) detection capability; 4) eye safe, solar blind daytime operation through shielding at the probe tip; and 5) assessment of complex mixtures. Figure 12B shows the handheld detector, an air monitor, and a surface detection device.